Report on Chancellor's Fund The Green-Blue-Grey Campus/Rain Garden Project

Project Funder: University of Glasgow Chancellor's Fund

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EXECUTIVE SUMMARY

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Figure 1: Rain garden experiment

1. Executive Summary

i. Summary Introduction

The Chancellor's Fund Green-Blue-Grey Campus project brought together University of Glasgow staff and students from Geography, Theatre Studies and Glasgow University's Sustainability Team in an art-science public engagement project. The project used creative art-science methodologies to explore, devise and test strategies for successfully integrating Green-Blue-Grey infrastructure with specific reference to the sustainable design features of the ongoing university campus redevelopment.

The project was building on live research across both Geography and Theatre Studies, in particular Naylor et al's (2017 and ongoing) "Greening the Grey" work and Donald and Millar's (ongoing since 2013) "Guddling About" work. Specifically, it was testing out methods identified by Donald and Millar in their (2018) "Living, Working, Playing with Water" project: a creative toolkit devised to address gaps in public knowledge about sustainable design.

The project was devised by interdisciplinary doctoral and postdoctoral researchers Rachel Clive, Neil Jackson and Philip Nicholson, with input from Theatre Studies master's students. It was delivered in partnership with Glasgow University's Sustainability Team, the Maggie's Centre, Kelvin Park Early Years Centre and Multiplex/ Careys. The project engaged with diverse publics who access / live / work in relationship with the university campus redevelopment site, including local residents, students, passers-by, tourists and workers.

The project team focussed on the sustainable design feature of the rain garden, a sustainable urban drainage system that will be constructed on the new campus.

ii. Summary Aims

The Green-Blue-Grey Campus project aimed to:

1. Raise public awareness of sustainable urban design in the context of increased surface flooding, with a focus on Green-Blue-Grey infrastructures and strategies to mitigate the effects of excess rainwater.
2. Gather information/ consult with diverse publics around understandings of Green-Blue-Grey infrastructures, including the role they can play in sustainable urban design and their effects on essential health and well-being, and biodiversity.
3. Build new partnerships of people interested in the environmental aspects of urban regeneration in the context of accelerating climate change.

iii. Summary of Structure/ Methods

The project employed and tested three primary creative art-science methods:

Method 1: "Guddling About" using, adapting and building on the toolkit devised by Donald and Millar in their project "Living, Playing, Working with Water" (2018)

Method 2: Mobile Spatial Video Geonarrative (SVG) interviewing and digital storymapping building on work developed by Nicholson et al in mapping collaborative knowledge production in art-science projects (2019)

Method 3: Creative Workshopping and Focus Group work, building on the combined expertise of the team.

iv. Summary of Findings

Sustainability Findings:

- Sustainability is of great interest and concern to diverse publics, but specialist languages can intimidate and divide people – playful art-science practices can help to counter this and create new shared languages across traditional divides.
- People are interested in how water moves and in how urban water systems join up. People would like more information about this.
- People are concerned about climate change but have given less thought towards the potential of flooding in the Glasgow West End. Nevertheless, they are generally supportive of measures which could help to reduce flood risk.

Waterplay Findings:

- Water can be a playful and positive connector of people and place. The "Guddling About" methods and Living Working, Playing with Water toolkit are generative of new art-science practices and effective in engaging publics in new ways as a result.
- People enjoy connecting with water and are happier connecting directly through water than through hidden or fenced off systems.
- Attitudes to playing with water are culturally-specific and vary depending on people's formative experiences of water.

Design Findings:

- Designers and architects need to communicate with those working on the ground.
- Publics appreciate sensory, interactive and playful aspects of sustainable design.

Public Engagement Findings:

- Diverse publics have strong connections to the campus site and want to be consulted with regards to its redevelopment.
- There are capacities and possibilities for sustainable practice which are not being realised because of socio-economic inequalities and land ownership issues.
- To be effective, public engagement needs to be long term and embedded.
- SVG and digital storymapping work can help to map complex art-science/ sustainability projects and capture knowledge produced collaboratively.

(next spread)
Figure 2: Aerial image of development site courtesy of Multiplex

CHAPTER TWO

BACKGROUND

2. Background

i. Climate Change: Driving Force

Our world and our climate are undergoing significant change driven by our own desire for rapid development. As the concentration of greenhouse gases in the atmosphere increase to the highest levels ever recorded (Betts et al., 2016), and with them the average global temperatures, our weather systems become more unstable, more unpredictable and more hazardous.

At the forefront of this instability is the water cycle. Changing weather patterns result in higher frequency flood and storm events (Sayers et al., 2016), as well as increases in the number of droughts. Meanwhile, mass urbanisation has led to a huge increase in the construction of impervious surfaces (Ellis, 2013). In such circumstances, it is necessary to begin the process of adaptation. To successfully adapt to climate change we must ensure that sustainability is at the forefront of our design.

ii. Green-Blue-Grey Infrastructure

The concepts of green infrastructure and sustainable urban drainage, and their benefits in terms of reducing flood risk, cleaning air and water, ameliorating extreme weather, and supporting resilience of ecosystems and biodiversity, are now widely understood. (Dover, 2015). Similarly well understood are the human health and well-being benefits of "Green-Blue" infrastructures. What is perhaps less widely developed is how we can incorporate some of this green-blue thinking into our densest urban redevelopment projects where space limits the more conventional green infrastructure measures like parks. Greening these greyer areas of our cities is thus key (Naylor et al, 2017) to aid successful adaptation to climate change. In addition, there is the need for sustainable development to create green-blue “corridors” in our densest urban areas, to link between areas of green and blue and alleviate the impacts of climate change on infrastructure and society.

iii. Sustainability and Slowing the Flow

Sustainable development was defined by the Brundtland Commission in 1987 as development which satisfies the needs of the present without adversely affecting the conditions for future generations. The redevelopment of the Western General Infirmary site by the University of Glasgow (UoG) aims to provide a campus which is sustainable; financially, environmentally and as part of the community of the West End, Glasgow City and Scotland.

The campus redevelopment site is surrounded on one side by the "green" of Kelvingrove Park, through which the "blue" River Kelvin makes its way from Central Scotland to the Clyde. The building site, which is currently very "rey" is surrounded on its other sides by the "grey" of the burghs of Partick and Hillhead, which themselves are flanked by Victoria Park and the Botanical Gardens respectively.

Scottish Government guidance states that all residents should be within 400m of a natural green space, whilst also recognising that Green-Blue corridors should be created in order to connect these areas together. Sustainable urban design developments, led by the University and Multiplex, could clearly help with the creation of a network of Green-Blue corridors in the area, and help to position the university as a sustainability leader in the process.

As part of the drive to practice and encourage sustainable development the University has already committed to employing its own Sustainable Urban Drainage System (SuDS) in the form of a rain garden.

Whilst attempting to control and mitigate flood events, SuDS systems including rain gardens "subvert the notion of containment and rapid transit for urban runoff, making it more acceptable for water to be in the city" (Jones & McDonald, 2007: pp.535). SuDS seek to use and enhance natural processes to imitate the hydrology of an area before it had been developed and, in the process, improve runoff quality and reduce quantity downstream (Woods-Ballard et al., 2015). To put it simply, rain garden systems aim to slow the flow.

We were interested in the layers of diverse human connections with the campus redevelopment site over time, as it transitions from the old Western General Infirmary to the new university campus. In response to a growing raft of research (Donald, 2016, 2019; Neimanis, 2012, 2017; Strang, 2014) which understands water as "a useful focus for thinking about relationships between things and persons and between material properties and meanings" (Strang, 2014, p133) we wanted to know more about how both water and humans are moving through and with the site in this time of increasing water cycle instability.

iv. Human-Water-Earth Connections

We were interested in intervening in these movements and relationships in order to draw attention to them, to the instability of the water cycle and our own reliance on it. “Paying closer attention to how we imagine water, and attempting to forge alternatives to our dominant imaginaries, is not just a thought experiment. It is a means for cultivating better ways of living with water now.” (Neimanis, 2019, p21)

We wondered how aware, interested or supportive those who access or live by the site are of the sustainable design incorporated into the campus redevelopment, in particular of the proposed rain garden.

We also wondered what we might learn from engaging with the diverse publics, both specialist and non-specialist, who access, live by or work on the site, in terms of developing understanding about the implementation of Green-Blue-Grey infrastructure in the context of urban redevelopment.

CHAPTER THREE

ART-SCIENCE PRACTICE AND PUBLIC ENGAGEMENT STRATEGIES

(previous spread)
Figure 3: Point of view video still from SVG interview

3. Art-Science Practice and Public Engagement Strategies

Art-Science strategies and collaborations are increasingly being used in both arts and science contexts by those with an interest in raising awareness and consulting with diverse publics about aspects of climate change (and what we might do about it).

The Green-Blue-Grey Campus/Rain Garden project was explicitly building on the art-science expertise of the wider project team, and involved sharing practice, skills and knowledge between us, across Theatre Studies, Geography and Geology and in partnership with the University Sustainability team. In particular, it experimented with the "Guddling About" methodology and "Living Working Playing with Water" toolkit of theatre studies scholar-practitioners Donald and Millar (2016, 2018) and referred to the public engagement, art-science and educational work of geologist Naylor (2017, 2018, 2019). The digital storymapping work of geographer and artist Nicholson (2019), the vital materialist storying/ performance work of interdisciplinary PhD student Clive, and the on-site green screen sustainability work of interdisciplinary PhD student Jackson were key to the delivery of the project, and in generating new research possibilities and insights through cross-fertilising aspects of Donald and Naylor's work with their own practices. This collaborative approach resulted in a layered and perhaps surprisingly coherent and accessible public engagement process with multiple outputs and valuable findings (see findings above and below). Donald conceptualises "Guddling About" as an experimental and generative "apparatus" which through repeated and documented playful activities with water and people offers us "a model for (human) accountability that lies in continual attentiveness and responsiveness to changing conditions" (Donald, 2016, p261).

In the Green-Blue-Grey Campus/Rain Garden project, Clive and Jackson, with input from Theatre Studies master's students, adapted some "Guddling About" practices directly from Donald and Millar's "Living, Working, Playing with Water" toolkit (2018) as well as creating some new practices and techniques inspired by it. In this way they hoped to develop human awareness (their own and those of the diverse publics they engaged with) of the "becoming" of the new university campus, and to enhance "attentiveness and responsiveness" (ibid) to the way that humans and water are moving (or not) through the site, as both site and climate change.

Similarly, for Nicholson, art-science collaboration offers radical possibilities to "develop scientific visualisations of process and event that refuse to disambiguate the human from the natural" (Nicholson et al, 2019, p8). Nicholson's work is also concerned with collaborative and reflective knowledge production, especially in contexts of transition.

In the Green-Blue-Grey Campus/Rain Garden project, Nicholson employed sophisticated mobile interviewing techniques with people who have an everyday living interest in the redevelopment of the site, from which he created an interactive storymap (external link to storymap website). This work complemented the more hands-on "Guddling About" and workshop activities, while simultaneously enhancing the documentation of the project and its processes.

Naylor's work is deeply committed to developing human responsibility for the environment. Her public engagement and educational sustainability work, which is closely tied to policy, seeks maximum impact on human practices with regard to adaptation and sustainability in the face of climate breakdown. She also has experience of working with artists, designers and makers to improve communication of complex scientific findings (Risner et al. 2019) and to create practical means of improving ecological outcomes on hard, grey infrastructure (e.g. Naylor et al. 2017).

Donald's "Guddling About" work on the other hand takes a much more indirect approach to change, and aims to "unsettle(s) assumptions about human responsibility for environmental issues such as climate change and fossil fuel depletion, proposing a different type of accountability" (Donald, 2016, p267). Applying techniques from Donald and Millar's toolkit in the public engagement and educational contexts in which Naylor operates, and bringing this together with the combined expertise of Clive and Jackson, and the mobile interviewing and digital storymapping work of Nicholson, has generated new understandings, techniques and dialogues, some of which are detailed below. Through analysing the data generated, and reflecting upon the processes involved, we have extracted key findings with regard to the four themes of: sustainability, art-science research practice, SuDS/ rain garden design and public engagement practice (see Findings). We have also outlined six key recommendations for the implementation of the UofG rain garden in the campus redevelopment process (see Recommendations below).

We will now discuss the processes and findings of the three methods employed in the project before concluding with feedback from participants and identifying the key recommendations to take forward in the University of Glasgow rain garden design process.

CHAPTER FOUR

METHODS

(previous spread)
Figure 4: Miniature rain garden experimentation 1

4. Methods

i. Method A: "Guddling About"

Using, adapting and building on the toolkit devised by Donald and Millar in their project "Living, Playing, Working with Water" (2018)

As well as borrowing and testing a number of "Guddling" techniques directly from Donald and Millar's "Living Working Playing with Water" toolkit, we also devised our own across the theatre studies/ geography disciplinary interface. We guddled at four different carefully chosen locations around the university campus redevelopment site over several days.

The rain garden and the miniature rain garden

As one of our main aims was to engage with a range of stakeholders to explore aspects of the sustainable design incorporated into the university campus redevelopment, we first sought further details about the proposed rain garden itself from the programme delivery partners for the campus redevelopment, Multiplex. The design plans of the rain garden currently stipulate that it is to be split into three sections each connected underground before feeding into the River Kelvin. Each section of the rain garden will be formed of a mixture of vegetation, in the form of grassland and trees, as well as stone feature elements. As the garden descends towards the River Kelvin, the sections will become more saturated but the designs do not currently stipulate that water will be visible or accessible in any.

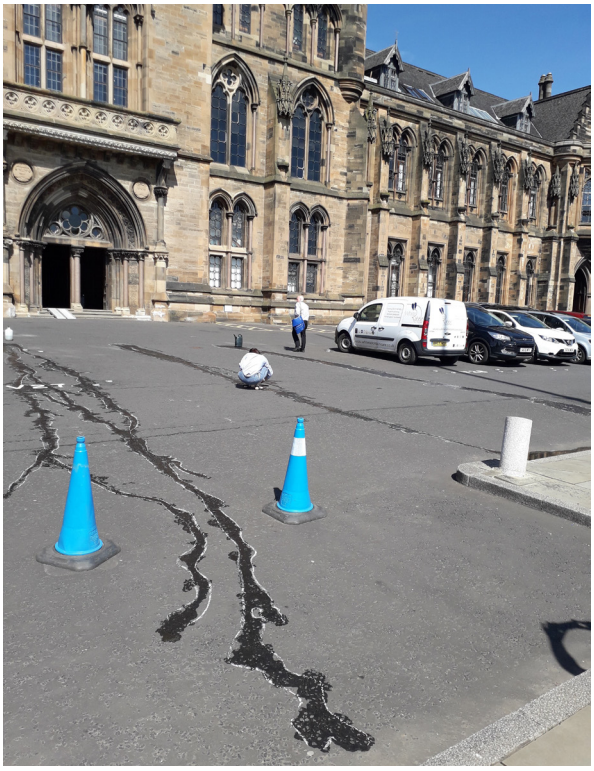
We decided to create our own "apparatus" in the form of an interactive miniature rain garden structure, based on the designs procured from Multiplex.

Our first "Guddling" location was outside the Gilbert Scott building, a popular historic location on the main university campus. At this location we invited people to design their own, miniature rain gardens, with one specific instruction - to slow the flow of water through the structure. To do this, participants used a mixture of vegetation, gravel and pebbles. We then simulated a heavy rainfall event and measured how long it took a prescribed amount of water to pass through the structure. To introduce an element of subversive playfulness, we recorded times and water volumes to see whose design would absorb the most water. The aim was not to create the fastest, but the slowest water flow. In the spirit of sustainability, this water was then captured and re-used for the next participant.

The activity was performed outside of term time and attracted some degree of curiosity. The majority of passers-by were local people cutting through, tourists, university staff, postgraduate and prospective students. Some people initially thought we were selling plants, others thought we were conducting lab experiments outside.

Participants in the miniature rain garden activity achieved varying degrees of success with their designs which varied considerably in their composition and structure.

[Clockwise Figures 5, 6, 7, 8] →
- Rain garden winning design
- Desire lines
- The most absorbtive materials - grass and earth
- Slopes, desire lines and passers by



[Clockwise Figures 9, 10, 11, 12] →

- Discussing adaptation
- Seeking the voice of the water 1
- Seeking the voice of the water 2
- Seeking the vioice of tha water 3

During all our "Guddling About" and workshop processes we recorded interactions via photography, video, audio recordings and on giant communal scrolls that we carried with us from place to place. Analysing this varied documentation reveals how play and off kilter experimentation can engage people directly with the mechanics of sustainable design, opening up practical and positive dialogue. In addition, play can quickly show what does not work as well as what does work in practical terms, and it can enable light-hearted and productive discussion and reflection about this rather than embarrassment or shame. Interestingly, one participant's (an engineer's) rain garden design clearly demonstrated that building higher walls to try to minimise the perceived threat of excess water flow, while tempting, was one of the least effective ways of slowing the flow. Most effective were the layered designs that worked with and tried to maximise the water flow's connection with absorptive materials, rather than those which tried to isolate or trap the water.

The miniature rain garden structure travelled with us as we "guddled about" on three further locations on site, where it continued to prompt explorations and dialogue. It also came with us to the final workshop, where it helped us to synthesise findings. It was effective in bringing diverse peoples together in mixed groups to focus playfully on the main concerns of the project - the materialities and processes of the proposed rain garden design (see Background).

Chalking Water Desire Lines

The second "Guddling About" technique we played with was the performing and chalking of water desire lines. We wanted to draw public attention to the way that water moves on, through and in connection with the site, and to how we move with it. As one, we each released a watering can full of water outside the main university entrance, then followed it, on our hands and knees, chalking around it as it moved down the slight gradient from the entrance across the road to the flagpole.

The paths the water took round the concrete and gravel were braided and intricate. Although the water evaporated fairly quickly, the chalk marks stayed on the ground and were not erased until rain fell some days later.

Directly after this performance, we noted down our thoughts and observations on the scroll. We discovered that the activity had affected us emotionally as well as intellectually, and had in some way intervened for all of us in our everyday relationships with both water and each other, making us more sensitive and attentive to both, as well as more conscious of our own bodies in space and place. Given that we were hoping to work in such a way with others, in a way new to us all, it felt important that we experienced the value of this together first. In terms of design findings, the affective nature and impact of these activities also highlighted to us the potential for and value of some kind of more permanent public art/sculptural intervention or installation as part of the rain garden design.

Figures 13, 14, 15
Passing water by hand

Speed, Patterns and Flows on a Slope – Seven Experiments/ Performances

The next "Guddling About" activity we created was in some ways a combination of the first two. We wanted to explore how water was moving through different materials, and in relation to different slopes, and to bring people's attention to this, and to how this might be changing with the campus redevelopment (in particular with the rain garden designs). We positioned ourselves at the strategic point of the university entrance to the Multiplex construction site, and released a small watering can full of water at strategic points around this entrance. We then measured how far the water ran until it stopped, observed how it interacted with different materials and contours, and chalked round the water desire lines (where we could) as it moved. Given our interest in the rain garden design we were interested in which materials slowed the flow of the water down, which absorbed the water, which diverted it and which carried it quickly away. We were also interested in how people reacted to water moving along the surface of the site.

Some people watched our performance experiments with interest and others moved out the way. Some people stopped to see the patterns the water was making through the site, others hurried by. We all had to move out the way when vehicles passed. We documented the experiments and their findings on our communal scroll and discovered that grass was the most effective material in absorbing water and slowing the flow. Grass and earth were also the most effective in generating biodiversity, as various insects, including bees, were observed in the grass as we guddled (see Findings / Recommendations).

Conversely, the water travelled furthest and fastest down the road and paving stones, although the large squares of stones on the pavement created the most complex patterns.

These performative experiments left us wondering how the new (water) desire lines of the campus redevelopment and the rain gardens will interact with the desire lines of the old buildings and materials, as well as with the slope of Gilmorehill, and the river itself.

They also prompted us to think about and discuss what the material on the ground of the new buildings will be. Will it be permeable? Absorptive? How sloping will the site be?

Collecting the Water/ Voice of the Water

The third "Guddling About" location was the pedestrian bridge over the River Kelvin, between the university and Kelvingrove Museum. This is the point where any excess water from the new campus redevelopment is likely to flow down and join the river. There was a quiet but steady stream of passers-by, some of whom were admiring the view, others of whom were observing and chatting about the building site, explaining how:

"The university has reclaimed the land (from the hospital)"

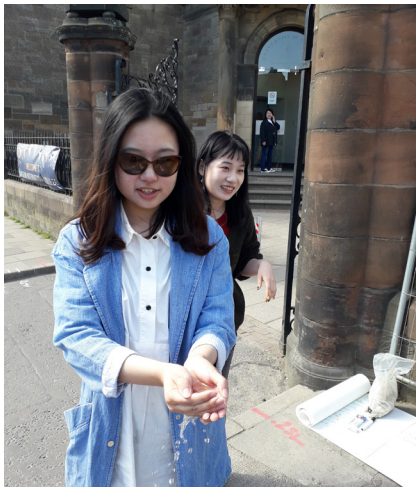
Some people stopped to chat and one local man asked of our extended rain garden apparatus, "Is this to save the planet?" We wondered together whether it might be too late to "save the planet" in the way the man meant, and discussed ideas of adaptation, interconnection and damage limitation.

In this activity we worked with Donald and Millar's toolkit in conjunction with ideas brought by Zhang, another Theatre Studies master's student on placement with the project, Yingying Liu. We wanted to make a more explicit connection between the grey, the green and the blue. Liu and another Theatre Studies master's student, both of whom were fairly new to the local landscape, were tasked with collecting ('borrowing' – in Donald and Millar's terminology) water directly from the River Kelvin, one of the tasks Donald and Millar suggest in their toolkit. Collecting the water from the river itself was not straightforward, as the water was low and the banks high, and it engendered a new sense of connection with and respect for the water for the two master's students.

After collecting the water, we improvised with everyday materials such as jam jars and teaspoons, materials we had brought with us to play with the idea of finding the "voice" of the river water. This process revealed how different water levels sound and introduced ideas of containment and flow, rhythm and tone. Our playful and inexpert performances subverted the clichéd roles of the accomplished musicians busking in historic locations. In doing so we aimed to bring attention to the water and materials we were playing with, and to how they might connect (or not) with the water running under the bridge, and the water constantly circulating between and around us. Again, this suggested to us the potential for some kind of permanent sculpture or installation as part of the rain garden design, which could enable the "voice" of the water to be experienced as it moves through the site (see Design Findings).

Passing Water Between Us – Conserving and Re-using

The final "Guddling About" location was right on the edge of the building site of the campus redevelopment at the end of Dumbarton Road, at the point where the old hospital entrance used to be. We positioned ourselves on a wide part of the pavement outside the International Language school near the Maggie's Centre,



Figures 16, 17, 18
Passing water through a drainpipe

one of the key partners with the project, who we had invited to participate in the mobile interviewing part of the Green-Blue-Grey project. Roadworks were going on around us, and both pedestrian and vehicular traffic was constant and sometimes busy. It was the least “green” and the most “grey” of our "Guddling About" sites. In terms of dialogue, it was the most engaged (and critical), and in terms of infrastructure and construction, it was the most transitional.

We soon discovered that the building site was affecting those working and studying right next to it. A lecturer at the International School, who stopped to chat with us, and to find out what we were doing, told us:

“The building works are doing my head in. The dust. The noise. The pollution. The building shakes. I feel bad for the students. The sooner the rain garden comes the better!”

Various people, including international students stopped to ask us if we were doing an experiment, and when we talked about the rain garden one person said:

“The rain garden sounds better than the building. That will be zen.”

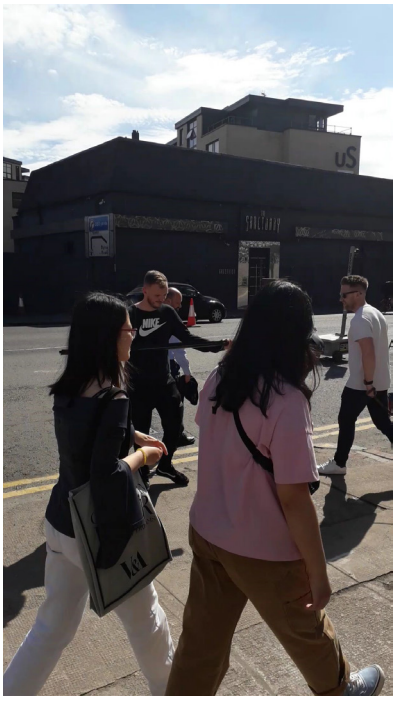
This was one of many times during the project that we realised the misleading nature of the name “rain garden” or perhaps of the disconnect between people’s desire for a visible, accessible rain garden with the current plans for a rain garden SuDS that will be largely hidden and inaccessible. This realisation has been reflected in our findings (see findings), which point to the need for more compelling aesthetic interventions and appealing design solutions.

At this fourth site we played with Donald and Millar's technique of “passing the water by hand” between people, observing what happens to the water, to our connections with the water, and to our connections with each other. We started by passing the water between ourselves, then took the activity outwards, seeking to meet people through water, offering passers-by water from our hands.

We observed the way that water connects people equally, across differences, and noted the sense of intimacy that sharing water between hands gave us. We were interested by the different reactions of members of the public to being offered water from the hands of a stranger – this ranged from confusion, surprise, laughter and gratitude to mistrust and even anger. We decided to extend the activity by offering people water through a plastic drainpipe rather than from our hands. How would this change the quality of the connection between humans as well as between water and humans? Some people were still able to enjoy the feel of the water, even when it was received through a drainpipe, with one young woman exclaiming:

“It feels so nice!”

Figure 19
Passing water by hand



Figures 20, 21
Embodying the Drainpipe

Figures 22, 23
Drainpipe performance

Figure 24
noting observations on the scroll

Perhaps unsurprisingly, however, most people were not receptive to being offered water from a drainpipe, and far fewer people accepted the invitation to receive the water than had when the offer was made human hand to human hand. We saw how quickly water became devalued as a connector when it was mediated by a structure associated with building infrastructure, and how the plastic of the drainpipe acted as a barrier, interrupting the human-water connection. We were also interested in attitudes to the drainpipe itself. We improvised performing with the drainpipe, attempting to embody it:

"I feel like I am becoming a drainpipe!"

It was interesting to witness the very low status of drainpipes in the built world, and to see how quickly a drainpipe becomes completely ignored, even when it is quite absurdly out of context. Again, this had obvious implications for the design thinking of the rain garden, prompting us to think that a design that offered opportunities for engagement, connection or pleasure, might be one that was more valued and respected than one which was hidden away or blocked off, or seen as merely functional (see Findings / Recommendations).

Our final activity at this site was to improvise a group performance. We erected a mock drainage structure, held together by our bodies, through which water ran out onto the street.

People's reactions to these performances varied, some people were curious, others presumed we were trying to sell something, or advertise something. Given that most of the language students were from the global south, where drought can be more of a pressing problem than flooding, some expressed concern that we were wasting water, which opened up some interesting discussions. This led us to adapt our performance structure: we improvised trying to capture the water from the drainpipe, while also attempting hopelessly to rescue fallen water from the pavement with a teaspoon. In doing this absurd improvisation, it became obvious how difficult it is to conserve surface floodwater, something which prompted further discussions about sustainable design.

These final performances highlighted questions of waste and conservation; generated insights about the cultural specificity of our relationships with water and water processes (and each other); and talked to the importance of us remaining aware of our global as well as our local responsibilities in sustainable design processes (see Findings / Recommendations).

ii. Method B: Spatial Video Geonarrative (SVG)

Interviewing and digital storymapping building on work developed by Nicholson et al in mapping collaborative knowledge production in arts-science projects (2019)

The second method was more high tech and targeted in its public engagement strategy, and built on Nicholson's SVG interviewing and digital storymapping practices. We recruited members of the public to take part in mobile interviews with Nicholson in and around the development site. Participants included workers at Maggie's Centre, a holistic cancer care information service located on the south side of the new development; students at the university; members of the Glasgow University Environmental Sustainability Team (GUEST); and members of the sustainability team at Multiplex.

We were interested particularly in working with the Maggie's Centre, because we wanted to open up dialogue about health and well-being with regard to Green-Blue-Grey infrastructure, and also because the Maggie's Centre administrative centre lies right between the campus redevelopment site and the river.

Participants were asked to prepare for the interview by reflecting upon three questions set by us (figure 27) and sketch out a provisional route for a walk in the vicinity of the development site. Participants were asked to wear an action camera on a harness around their torso, and a clip-on microphone to provide point of view footage of a mobile interview. During the interviews Nicholson carried a small GPS device to enable a GPS track of the route taken (see GPS tracks in Figure 26).

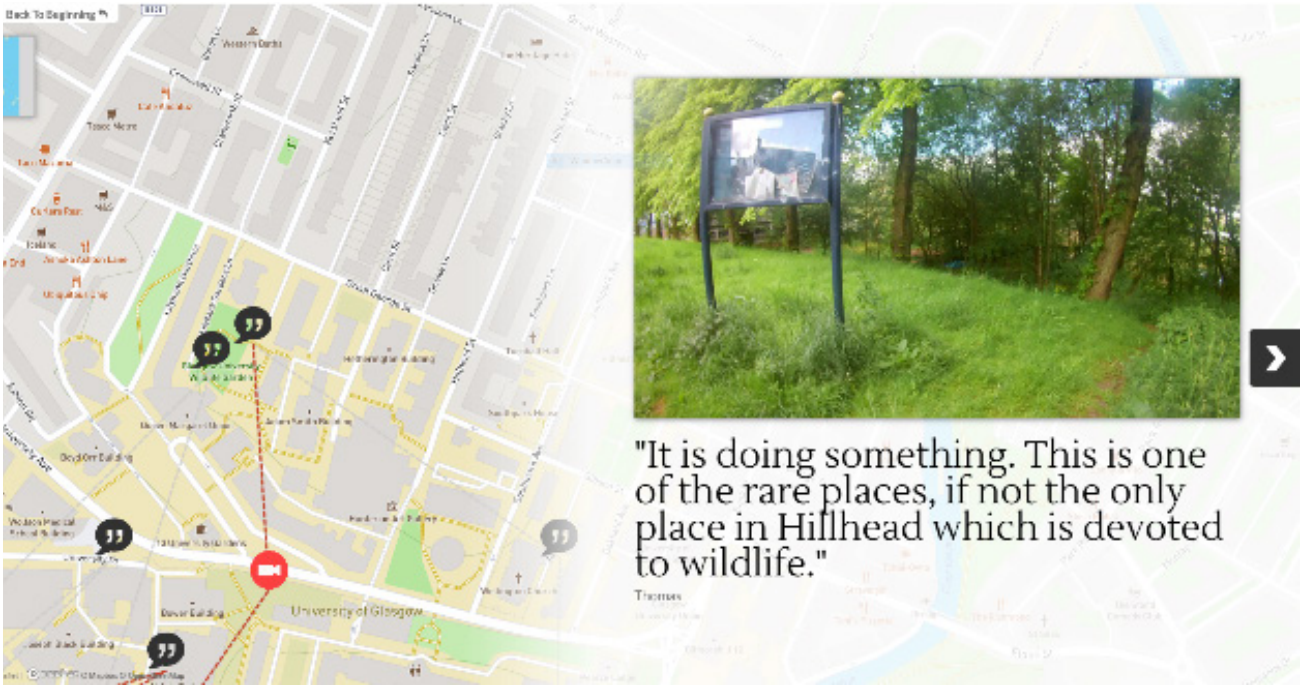
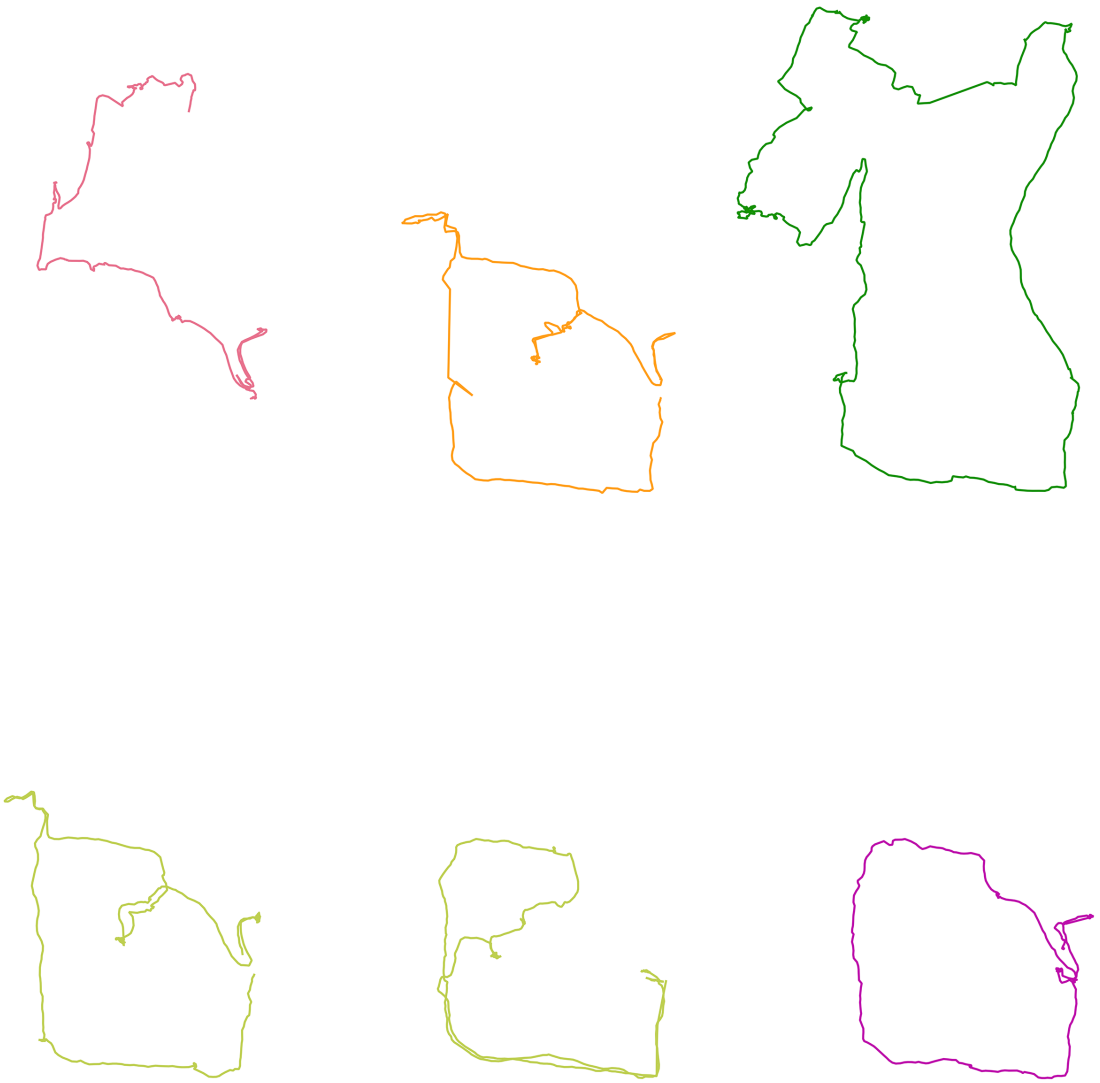


Figure 25
Screenshot from storymap

All of the interviews started at the same location – just outside Maggie's Centre on Dumbarton Road – but most took different routes around the university and development site and pointed out different things in response to the set questions.

Once Nicholson had completed the mobile interviews he listened to the audio recordings and reviewed the video footage looking for interesting insights. Once he had three or four useful quotes, audio or video clips (figure) from each interviewee he used the GPS data collected during the interviews to tag them on a storymap. He used the storymap.js (https://storymap.knightlab.com) storymapping website to do this.

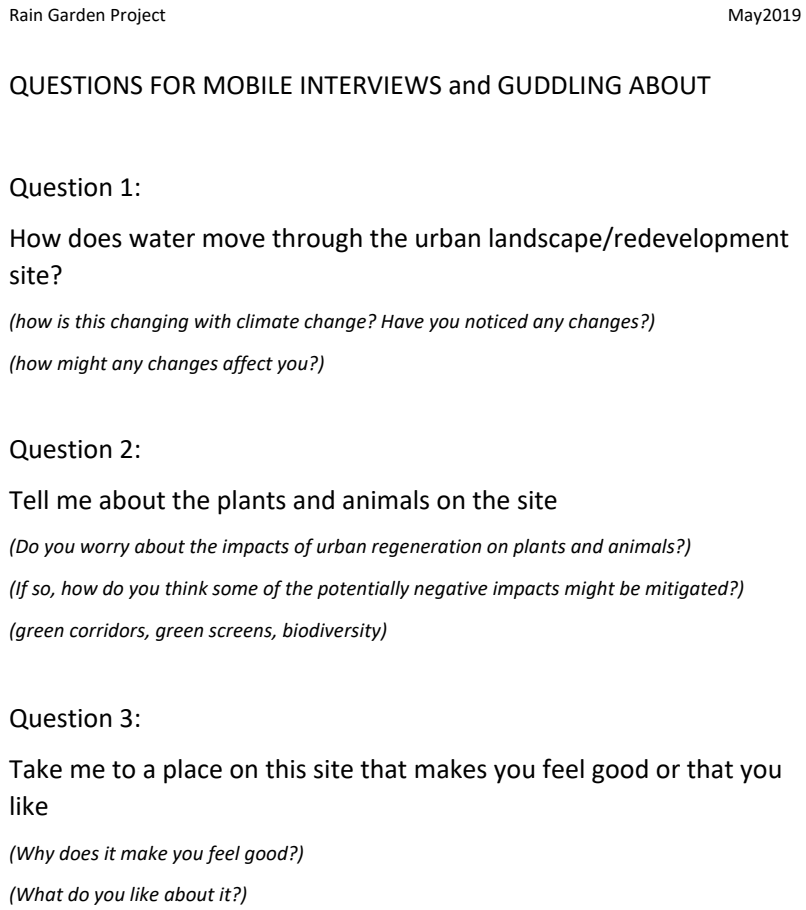
Figure 26
All GPS Tracks from SVG interviews



Analysing the data, Nicholson discovered that:

- Interviewees were concerned about the impact construction and increased urban development would have on the health of the River Kelvin
- All expressed a desire for more greenspace, some noted the need for greenspace that improved biodiversity rather than being purely tokenistic.
- Some noted frustration with too much concrete.
- Some admitted that they rarely thought about urban drainage, even when faced with flooding events.
- Some spoke excitedly about the potential of urban renewal as an opportunity for better design that supports biodiversity.

These discoveries, as with the discoveries generated in the other methods, have been embedded into the project findings and recommendations (see Findings / Recommendations). The SVG method of mobile interviewing, employed by Nicholson, was selected for its usefulness in capturing and narrativising situated knowledges, as a way to understand individual personal relationships to place, and gather differing disciplinary perspectives (Curtis et al., 2015). It has also created an engaging resource in it's own right (See Figure 25).



Rain Garden Project May2019

QUESTIONS FOR MOBILE INTERVIEWS and GUDDLING ABOUT

Question 1:

How does water move through the urban landscape/redevelopment site?

(how is this changing with climate change? Have you noticed any changes?)

(how might any changes affect you?)

Question 2:

Tell me about the plants and animals on the site

(Do you worry about the impacts of urban regeneration on plants and animals?)

(If so, how do you think some of the potentially negative impacts might be mitigated?)

(green corridors, green screens, biodiversity)

Question 3:

Take me to a place on this site that makes you feel good or that you like

(Why does it make you feel good?)

(What do you like about it?)

Figure 27
Questions for interview participants

Figures 28, 29, 30
Passing the water through different materials

iii. Method C: Creative Workshopping and Focus Group work

The final method used in the project was that of creative workshopping and focus group work. Three workshops were delivered as part of this strand of the project: a playful workshop with nursery children at the Kelvin Park Early Years nursery; a focus group workshop with contractors working for Multiplex; and a final workshop at the university which brought all strands of the project together to share findings and deepen processes and connections.

Workshop 1: Early Years

The workshop with the nursery extended the public engagement strand of the project, and gave us the opportunity to test out our art-science methods in a more formal educational context. In doing this we hoped to consult with the children about their understandings of sustainable design, while also responding to the Glasgow City Council priority area of becoming a sustainable city. We designed the workshop, in line with the Early Level of the Curriculum for Excellence, to provide children with both challenge and enjoyment, personalisation and choice through planned but flexible interdisciplinary small group work. We planned the workshop in close communication with the dedicated staff of the nursery, in order to enhance learning through building directly on what was familiar to the children. We also built on our own learning, developed throughout the Guddling stage of the project, with the various publics and processes we had engaged with.

We decided to focus imaginatively in the workshops on the river and the biodiversity around the river. In preparation for the workshop we created characters and an open-ended story with which to contextualise the sustainable design experiments. We also created a script, which ensured we covered the key areas we wanted to explore with the children and ensured that we had a common understanding between ourselves (and across language and disciplinary divides) of what we were doing. We wanted to open discussion about climate change and adaptation in a way that wouldn't engender fear or despair, but instead would stimulate problem-solving and play.

Creative play activities explored how water is transferred, how it is absorbed, how it flows, how it sounds, how it moves through different materials and how we relate to it in terms of story and responsibility. This enabled multiple entry points for the children to access the deeper questions being explored in the project and to share their ideas and insights, some of which were very astute and imaginative. One child suggested that we need to develop closer links with animals and trees if we are to mitigate flooding. Another questioned using plants to soak up excess rainfall or river flooding when some plants do not like too much water.

Figures 31, 32
Introducing difficult ideas through imaginative story and play

Figures 33, 34
Playing with ideas of absorption and sound

Over the course of a day we worked with nine small groups of children to explore the same three questions being explored by Nicholson in the mobile interviews but in an imaginative, low tech and hands-on way. We also asked the children what they imagined to be the essential components of a rain garden, to which they responded:

Trees leaves flowers

Raindrops

Apple trees

A bluebird

This once again points to the fact that publics have an appetite for sustainable design with which their imaginations and senses as well as their brains can interact (see Findings / Recommendations) and for a further "greening" of the grey.

The children were very engaged in the workshop processes, indeed some didn't want to leave, and following the workshop the Head teacher wrote to thank us, saying "The children were completely enthralled by the project and some of the staff were excited too by your ideas."

Workshop 2: Construction

The second workshop we set up was with a group of contractors from Careys civil engineering company, working for Multiplex on the UofG campus redevelopment. This workshop was run in the form of a focus group with a groundworks engineer, freelance civil engineer and an experienced (30 years) machine operator, as well as a sustainability manager from Multiplex. All of the contractors had previous experience working on SuDs projects but were unaware at the outset of the UofG rain garden.

We started by passing water brought from another part of the university between us by hand, then we moved on to sharing our personal connections with the site and the local area before engaging in more focussed discussion. Passing the water between us by hand connected us at a fundamental level with each other, and the personal discussions revealed that all the contractors had a lifelong connection with the site, whether by living and/or working in the immediate area, fishing further up the river Kelvin or visiting the area for its museums and other attractions. All participants demonstrated a developed awareness of, connection with and respect for both the water courses and the history and layers of the earth on the site, as well as a sense of responsibility for the humans moving through the environment.

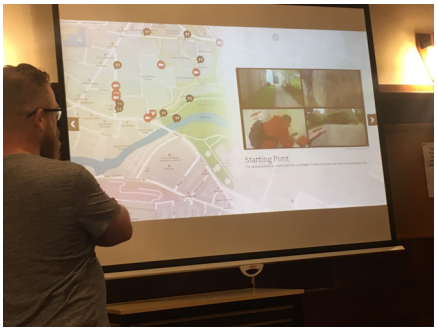
Figure 35
Discussions with contractors

With regards to the more targeted questions, the civil engineer noted that he had worked on several SuDs projects that were not fit for purpose when finally installed. This was primarily due to design issues and a lack of 'back and forth' communication between those on the ground and the designers/architects. The contractors suggested this could be overcome by ensuring that architects are more present on site and are more involved throughout a project, not just at the beginning (See Design Findings).

The contractors were very aware of the purpose of the rain garden in slowing the flow and providing habitat for wildlife. All agreed wholeheartedly with the engineer when he said:

> *"It feels better leaving a site with things growing and changing."*

In a way which was reminiscent of the performance experiment with the drainpipe (see Guddle 4), the contractors indicated that the vast majority of the general public have very little understanding of or interest in the systems and structures they rely upon to survive, and even less when these systems are hidden underground or behind walls and cavities.



Figures 36, 37
Exploring the storymap

They recommended some changes to make the rain garden more sustainable and effective. This included a sprinkler system using the captured water to water the plants and ensuring that there are no barriers around the system so it can be fully utilised and a valued part of the environment. In addition, they shared with us ideas they had for improving sustainability in their own homes, ideas they were unable to implement due to living in flats/ tenements/shared occupancy housing (See findings above). This is something which is clearly frustrating on a political and ecological, as well as on a personal scale, and could perhaps be the subject of an interdisciplinary project in its own right.

The closing message the contractors gave was to respect the ground and to respect water, because it always finds its way.

The Multiplex sustainability manager fed back to us via email that she had

"found the workshop with the construction workers made me think differently."

She was "interested by what they were saying about their connection to the land when working and how water is relentless and gets everywhere" and also "about how difficult it can be when they are working and they hit a water course." She was also interested in the contractors call for "better communication from designers i.e. them coming on to the site and seeing how difficult it can be." (see Findings / Recommendations).

This manager also wrote a report for Multiplex based on her understanding and experience of the Green-Blue-Grey project. This report indicated the efficacy of our methods in engaging diverse publics and stakeholders in questions of sustainable design (see Sustainability Findings), as well as the value for Multiplex of ongoing collaborations with the university.

Workshop 3: Bringing Everyone Together

In the final workshop we brought people who had participated in all three strands of the project together, to share our findings and to develop and deepen the conversations we had started about sustainable design. We also invited new parties in at this stage to join the process, including local community council members, environmental agency workers, artists, the university Dean of Public Engagement and the university Public Art Officer.

The workshop both showcased and developed the main methods we had used. We split participants into three mixed groups, which circulated around the three activities of

1. Exploring the storymap created from the mobile interviews
2. Designing a miniature rain garden, and
3. "Guddling About" with water outside, with a focus on sound.

Figures 38, 39
Designing the miniature rain garden

Figures 40, 41
Guddling outside

Participants enjoyed exploring the storymap, especially those whose routes and thoughts were recorded on it. One participant fed back later that she thought "the story maps are a great idea as they are so visual and interactive", with others agreeing that the "visual and hands on activities were really engaging."

While working on the miniature rain garden apparatus, participants were invited to write down any thoughts they had regarding the rain garden and wider themes of sustainability on a scroll. These thoughts included (see Recommendations):

"Make features that make changes visible and interesting"

"Add small/ shallow features to the landscape architecture of the square to channel surface water"

"Rainfall on the square towards and into the rain garden could create shallow reservoirs/ puddles that could become urban play features."

For the "Guddling About" activities, participants were led outside to a hidden and slightly neglected courtyard, where water was passed hand to hand, then drainpipe to hand. In a twist on Donald and Millar's original exercise, these activities were repeated with different instructions – to pay attention to conserving energy, and to pay attention to the feelings of giving and receiving. It was discovered that when participants only concentrated on conservation, water was lost more rapidly, whereas when participants focussed on the qualities of giving and receiving the water, and on the quality of connection, more water was automatically conserved. Again, this seemed to us to be significant in terms of sustainable design practices as well as in terms of wider ecological performance research. Participants then engaged in a variety of deep listening and water-sound games, designed to draw attention to the way that water moves through the site, and to the way that it interacts with different materials on the site, something being simultaneously explored in both the storymapping explorations and miniature rain garden design experiments inside. Participants came together at the end of the workshop to share and discuss experiences, thoughts and ideas emerging.

During this discussion, the university's Dean of Public Engagement, Kevin O'Dell, shared with participants that the university is interested in and keen to develop engagement with diverse publics, such as were present in the room. Participants fed back that they had enjoyed the different activities and especially the sensory nature of the workshop. There was a general agreement that the hands-on team building approach had been "a good way of getting interest" in what can seem like a specialist or unapproachable subject, and useful in breaking barriers between participants who had very different interests in the site (see Waterplay Findings)

"It was good to remember that water can be fun"

said one participant. There was some discussion around the way water had been approached in different ways over the course of the project and how that pointed to the potential for community building more generally around

questions of human-water connections and sustainability (see Sustainability Findings). There was an interest in human-earth connections too, and in how the way that people walk around the campus redevelopment site will change with "the new build" (see mobile interviewing, and Guddling 2).

With regard to the more technical aspects of sustainable urban drainage and landscape design, some concern was voiced that:

"we're disappearing the water in our landscape features."

There was a general consensus that "signposting' water – physically creating space for it" should be considered important in the UofG rain garden design (see Recommendations) as should designs and strategies for "capturing rainfall runoff."

There was much talk about the importance of accessible, playful and sensory design, with some participants enjoying working with "the voice of the water" some enjoying the feel of the water and the way it warms up when passed from hand to hand, and others enjoying playing with the way water was absorbed by different materials in the miniature rain garden apparatus (see Recommendations). Participants suggested the addition of solar-powered fountains or signposted runoff pathways might improve the sensory design of the rain garden. Finally there was some discussion around the way that water can be annoying and frightening as well as a pleasurable connector and vital element, and there was a general acknowledgement that "water is a powerful force" and "will always find its way."

The Multiplex sustainability officers noted that the whole project had been useful to them in terms of "how we engage with our team (engineers) to hit that emotive element." They also acknowledged that they had picked up lots of ideas from the various methods used in the project. The university sustainability officers on the other hand, said that the project showed the "value of the sustainability roles within Multiplex."

CONCLUSION, FEEDBACK AND RECOMMENDATIONS

CHAPTER FIVE

(previous spread)
Figure 42
Final discussions

5. Conclusion, Feedback and Recommendations

The Green-Blue-Grey Campus project was successful in the aims (also stated above) to:

1. Raise public awareness of sustainable urban design in the context of increased surface flooding, with a focus on blue-green-grey infrastructures and strategies to mitigate the effects of excess rainwater.
2. Gather information/consult with diverse publics around understandings of green blue grey infrastructures and their effects on increasing biodiversity and promoting essential health and well-being.
3. Build new partnerships of people interested in the environmental aspects of urban regeneration in the context of accelerating climate change.

It tested out and built on a variety of art-science methods, including "Guddling About", vital materialist storying/performance and geo-spatial mobile interviewing: methods that the University is currently leading research on. The project discovered that these methods are generative and adaptable and can be applied successfully in both public engagement and educational contexts in order to enhance understanding of /engagement with questions of sustainability and sustainable design. An unexpected insight was of the compatibility of the various methods, and the richness and relevance of the findings generated by using these methods together.

The project consulted with a range of stakeholders and publics, and brought diverse peoples together in order to think more holistically about sustainable design in urban redevelopment. As one of the Multiplex sustainability officers noted in his email feedback to us, the project had, for him:

reinforced the wide range of stakeholders that are interested in the development. Also that people have an emotional connection with different places around the site and that we (Multiplex) will be creating new places for people to connect with.

In terms of public engagement and educational outcomes, the deputy head teacher of the early years nursery, who had come to the final workshop at the university as well as working closely with us in the delivery of the workshop at the nursery, emailed us afterwards to say:

Just wanted to congratulate you on the innovative way you involved the whole community through the Rain Garden Project. It was inspirational to be part of the workshops and I felt early years were equal partners. Personally, I talked to people with whom I would never normally. The variety of activities got everyone communicating and broke down any barriers which may have existed. Truly, a community of learning.

The project generated a wealth of findings (summarised in the introduction above and discussed throughout this report) of value to specialist and non-specialist alike. It also created multiple forms of documentation, including an accessible and interactive story map (https://bit.ly/2wC0kM7).

Key recommendations emerging from the findings, to take forward into the rain garden implementation itself, are:

1. Signpost water features and processes creatively and imaginatively– people care about the area and the environment and want information.
2. Using creative public engagement practices was well-received and would benefit from being applied more widely.
3. Make the rain garden and the wider campus accessible, playful, green, blue and sensory – people want to connect with the water, with the earth and with each other, and feel better and healthier when they do.
4. A public art installation or sculpture as part of the rain garden design would help people to engage affectively with sustainable practices.
5. People appreciate greenspace not just for sensory reasons but also because it increases biodiversity. Think about design which actively increases biodiversity.
6. Involve diverse publics in the design process, and keep them involved during the construction and operational phases of the build.

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